iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** IX **Month of publication:** September 2022

DOI: https://doi.org/10.22214/ijraset.2022.46796

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue IX Sep 2022- Available at www.ijraset.com

A Study to Identify the Age of Menopause and Its Relation to Socio-Economic Determinants and to Assess the Knowledge and Attitude About the Health Effects of Menopause

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Abstract: ***Menopause is the most prominent event in women's middle age and marks the end of a women's reproductive life. Symptoms of menopause are the basis of health care providers and public health professionals to provide adequate medical care, including improving the physiological and psychological state of women. The main objective of the study was to determine age at menopause along with its health consequences and socio-economic determinants affecting the quality of life. A total of 70 women were enrolled in the study. Information was collected from 40-55 years old womens to estimate the age of menopause along with socio-economic determinants and health effects of menopause. Questionnaire was created consisting of socio demographic data, prevalence of menopausal symptoms, knowledge and attitude towards menopaus for data collection. From the study, we found the average age of menopause was 48.5 years, which is higher than other studies conducted in India, reason may be methodological. Psycho-physiological changes were associated with irritability, heart discomfort, anxiety, depressive mood, hot flashes, physical and mental exhaustion, sleep problems. There must be well planned, balanced health education and necessary treatment arrange for the welfare of perimenopause women for better quality of life. The obtained results were analyzed and discussed in detail.***

Keywords: Menopause, Hot flashes, Health care, Socio-economic determinants, Somatic symptoms, Psychological symptoms.

I. INTRODUCTION

Menopause is an inevitable stage in a women's reproductive life as she enters middle age. The word "menopause" ("mdnespausie") was first used in 1816 by Gardanne (quoted in Wilbush, 1979). Initially, the menopause was explained as a deficiency of ganglionic regulatory functions. But later, the ovary was recognized as an endocrine organ (Marshall, 1910). From an endocrine point of view, menopause represents primary ovarian failure and begins between the ages of 40 and 56, with a mean age of 51 (McKinley et al, 1985). Menopause is a lifelong process, which signals the termination of a women's reproductive health, by reducing the ability of the ovaries to respond to Follicle Stimulating Hormone(FSH), Luteinizing Hormone (LH), and reducing the production of Estrogen and Progesterone. As women grow older, some of the primary ovarian follicles grow into vesicular ovarian follicles throughout the menstrual cycle, and eventually deteriorate. As the number of primary follicles decreases, the production of estrogen in the ovary decreases, leading to the onset of the menopause. However, natural menstruation is defined by the World Health Organization(WHO) as, 'at least twelve months of successive amenorrhea, not due to surgery or any other reason'. Therefore, it is a retrospective diagnosis.

Menopause grows in response to reduced estrogen levels and disturbance of the hormonal cycle related with ovulation[1]. As menopause approaches, most women experience a change in their normal menstrual cycle, leading to a complete cessation of menstrual cycle in the postmenopausal phase. It is gradual and indicate the transition from the reproductive to the postpartum period of a women's life. During menopause, a women's fertility ceases as ovarian function ceases[2]. At the time of menopause, a large proportion of women notice dramatic changes due to fluctuation in estradiol (E2) and progesterone level[3]. However, in some women, the symptomatic conditions become alarming. This stage is associated with physiological changes. The physiological changes frequently associated with menopause are hot flashes, cold sweats, dizziness, headache, weight gain, pelvic pain, skin and hair disorders and changes in bowel habits. The most common psychological symptoms include depression, anxiety, irritability, mental confusion, feelings of stress, fatigue. Behavioral changes include decreased work performance, avoidance of social activities, etc.

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ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue IX Sep 2022- Available at www.ijraset.com

All these physiological, psychological and behavioral changes increase the risk of various chronic diseases such as osteoporosis and heart disease. After menopause, the risk of heart disease in women becomes almost equal to that of men[4–7].

Changes in sex hormones affect changes in the composition of bones, making women more susceptible to osteoporosis. Other related metabolic changes include hyper-cholesterolemia which tends to increase the risk of heart attack[5–7]. As a major cause of diseases like osteoporosis and heart disease etc in postmenopausal women, menopause and related hormonal changes cause symptoms that disrupt quality of life. Commonly reported symptoms include depression, anxiety, memory problems, urinary problems, night sweats, vaginal dryness, hot flashes and sleep disturbances[8]. Although differences in the prevalence of menopausal symptoms have been observed in Indian women from different region, Shah et al. states that muscle and joint pain are common symptoms while Sharma et al. has been described that lack of energy and fatigue are the most common symptoms of menopause[9,10]. In another study, Bagga observed that headaches and loss of interest were the most common symptoms of menopause. Other studies of menopause in Western countries have observed the prevalence of psychological and physical symptoms around menopause[11,12]. Many studies have reported that the natural process of menopause begins at the age of 45-55 in most women around the world, depending on the genetic and socioeconomic makeup, general health status, nutritional status, physical activity and their altitude levels[2–7, 13–20]. It is generally accepted that the mean age of menopause is around 51 years for developed countries[2, 13,14], and for developing countries, the age of menopause range from 43-49 years.

Menopause occurs in 3 phases:

1) *Pre-Menopause:* i.e. the preliminary ovarian dysfunction exhibiting physiological symptoms, initiated while menstrual cycle continue to be regular and few symptoms begin to appear.
2) *Premenopausal*: i.e. the transition period leading up to the actual event of menopause, where the hormonal, biological and clinical features of the impending menopause begin, and they are usually taken around the time period of 5 to 10 years. Most women begin to become aware of the menopausal transition in their mid to late 40s, during perimenopause. During perimenopause, monthly flow becomes irregular with increasing variability in bleeding duration, severity. The number of missed periods usually increases towards the end of perimenopause.
3) *Post-menopause:* i.e. the end of the menstrual cycle lasting more than 12 months and decreasing levels of estrogen and progesterone [2].

II. PURPOSE OF RESEARCH

1) Studying the age of menopause and socio economic determinants.
2) To study the knowledge and attitude towards menopausal health consequences.
3) To determine the prevalence, knowledge and attitude of menopausal symptoms in women 40-55 years of age.

III. RESEARCH METHODOLOGY

It discusses the importance of study design, study significance, Inclusion/Exclusion criteria, determine sample size, sampling design, data collection tools and techniques. It highlights the analytical plan of the study. In addition, it presents a brief discussion of the instruments and measures of selected variables created for the study.

1) *Study Design:* A cross-sectional study design was used to collect the data from females of age 40-55 years from villages of district Hamirpur, Himachal Pradesh. A study was carried out on 70 postmenopausal women in several villages in Hamirpur district.
2) *Inclusion Criteria:* All women of age 40-55 years with permanent residence, consented to participate in the study.
3) *Source of data:* The data has been collected in pre-coded and pretested performa in Hamirpur district villages from January 2022 to March 2022. A semi structured interveiw was developed covering general information(individual characteristics), socio-demographic, menstrual history, disease history, Habits, Knowledge and attitude of menopause. Data were collected from 8 villages(viz. Rail, Adarshnagar, Jamnoti, Beha, Putrial, Karandola, Bari, Palasi). As per the objective of the study, information was collected from women age 40-55 years to estimate age at menopause along with socio-economic determinants and consequences. A well structured questionnaire was developed and included socio demographic data, with regard to medical history, frequency of menopausal symptoms.
4) *Selection Of Study Area:* According to 2011 census of India, the total population of Hamirpur district living in rural areas is 423,338 of which male and female were 200,748 and 222,590 respectively. The literacy rate in rural area of Hamirpur district is 87.82%.According to the given demographic background, the study was conducted to investigate the “age of menopause”.

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5) *Sampling Method:* All women of age 40-55 years with permanent residence, consented to participate in the study. Sample size was computed by using the following formula

$$\text{Sample Size } n = N * [Z^2 * p * (1-p)/e^2] / [N - 1 + (Z^2 * p * (1-p)/e^2]$$

Where, n = Sample Size
N = Total number of sampling unit in the target population
e = Maximum estimation error accepted
z = Stastical parameter that depends on the confidence level
p = The numerical probability of success
1-p = The numerical probability of failure

6) *Data Collection:* Prior to data collection, the nature of the study was explained to all participants and informed consent was obtained. Using predefined questionnaires data were collected. Demographic variables including age, marital status, education, reproductive history, age of menopause, number of abortions were recorded. Socio economic status was determined by education level, monthly income, occupation, family size and frequency of meat consumption.The interveiw agenda was divided into two sections.The first section covered basic information about household characteristics and second section covered the individual information of the respondents. Household information i.e. general characteristics of the households such as occupational level, type of family, family size, family income were collected. Participants information regarding age, age at marriage, working status, sources of income, age at first time menstruation, marital status, age at last menstrual period, number of children by age, family type, disease history, knowledge and attitude of menopause were collected.

7) *Outcome Variables:* Age at menopause, menopausal symptoms were the major outcome variables of the study.

8) *Explanatory Variables:* Knowledge, Attitude towards menopause were taken as the significant predictors whose association was examined with age at menopause. Socio demographic (age, place of residence, education, income and occupation), reproductive information (age at first time menstruation, age at last menstrual period, operation/sickness before menopause, menstrual history, sources of information, disease history, habits, knowledge and attitude of menopause) were selected, based on the extensive reviews of literature that could affect respondents 'age at menopause'.

IV. RESULT AND ANALYSIS

1) *Statistical Methods for Data Analysis:* SPSS (Statistical package for social sciences) was used for data entry and analysis. Descriptive statistics are used to summarize and present data. The relationship between knowledge and related factors was analyzed using Chi square test and $p<0.05$ was taken as the level of significance. For knowldege calculation, each correct answer is given a score of "1" and a score of "0" for incorrect and unknown answers. There are 15 knowledge questions and the maximum score is 15 points. The average overall score is 62.282. Then, depending on the mean, the overall knowledge is divided into two groups named good and poor knowledge.

Chi square test with 95% confidence interval(CI) was used to investigate statistical significance.

Chi-Square test: The chi square independence test is a procedure to check whether two categorical variables are related in some population.This test was used to evaluate the association between two qualitative variates as under

$$\chi^2 = \sum(O_i - E_i)^2/E_i$$

where;
O = Observed frequency
E = Expected frequency
$\sum$= Summation
χ^2=Chi-square value

In this study, a total of 70 postmenopausal women were involved. Out of the 70 women studied 59(84.28%) were married and 11(15.71%) were single/divorced or widowed. The mean age of menopause of the study population was 48.5 years. The median age at menarche is 13.5 years. Only 5% of women get their period before the age of 12 while others get their period after 12 years. In terms of residence, as children, 77.6% lived in rural areas while 62.8% as adults lived in rural areas. A significant number of women 5(7.14%) had 1-3 miscarriages in their life while 1(1.42%) had more than 3 miscarriages. Further analysis was performed on groups formed by early and premature menopause and those with normal menopause. 82.25% of women are married and menopause had normal, 17.74% of women were single/widowed/seperated. 83.37% of normal postmenopausal women work as laborers or in the private sector, 14.51% of women were housewives and 1.612% are government employees. While of the 8 women with early menopause, 50% were workers or were employed in the private sector and 37.5% were housewives.

TABLE I: Association of socio-demographic factors with early/premature menopause in the study (n=70)

Socio-economic determinants	Earlymenopause(n=8)	Normal menopause(n=62)
Current age (years)		
40 – 41	1(12.5%)	0(0%)
42 – 43	0(0%)	1(1.61%)
44 – 45	2(25%)	5(8.06%)
46 – 47	3(37.5%)	11(17.74%)
48 – 49	2(25%)	16(25.80%)
50 – 51	0(0%)	26(41.93%)
52 - 53	0(0%)	2(3.22%)
54 - 55	0(0%)	1(1.61%)
No of miscarriages		
None	7(87.5%)	57(91.93%)
>3	1(12.5)	0(0%)
1-3	0(0%)	5(8.064%)
Education		
Illiterate	0(0%)	1(1.61%)
School	5(62.5%)	48(77.41%)
Graduate	2(25%)	12(19.35%)
Post Graduate/Phd	1(12.5%)	2(3.22%)
Marital Status		
Married	8(100%)	51(82.25%)
Unmarried/Widow/Seperated	0(0%)	11(17.74%)
Occupation Status		
Housewife	3(37.5%)	9(14.51%)
Labor/Private Sector	4(50%)	52(83.87%)
Govt. Employee	1(12.5%)	1(1.612%)
Income		
>5000	2(25%)	14(22.58%)
>10000	4(50%)	28(45.16%)
>20000	1(12.5%)	19(30.64%)
>30000	1(12.5%)	1(1.612%)
Number of Children		
1 Child	2(25%)	7(11.29%)
2 Child	4(50%)	47(75.80%)
3 Child	1(12.5%)	8(12.90%)
>3	1(12.5%)	0(0%)

TABLE II: Association of childhood and adulthood living status with early/premature menopause in the study (n=70)

	Early/prematuremenopause (n=8)	Normal menopause (n=62)	P Value
Childhood residence			
Rural	5(62.5%)	48(77.41%)	0.35
Urban	3(37.5%)	14(22.58%)	
Father/brother occupation			
Laborer	4(50%)	20(32.25%)	
Professional	2(25%)	28(45.16%)	0.02
Businessman	1(12.5%)	14(22.58%)	

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Unemployed	1(12.5%)	0(0%)	
Family size (childhood)			
1-5	4(50%)	55(88.70%)	
6-10	3(37.5%)	7(11.29%)	(0.0020; p<0.001)
> 10	1(12.5%)	0(0%)	
Meat intake (childhood)			
None	0(0%)	24(38.70%)	
1-2 times/week	5(62.5%)	12(19.35%)	(0.0035; p<0.001)
3-4 times/week	3(37.5%)	8(12.90%)	
1-2 times/month	0(0%)	18(29.03%)	
Adulthood residence			
Rural	3(37.5%)	45(72.58%)	0.04
Urban	5(62.5%)	17(27.41%)	
Family size (adulthood)			
1-5	0(0%)	15(24.19%)	
6-10	1(12.5%)	17(27.41%)	0.10
> 10	7(87.5%)	30(48.38%)	
Spouse occupation			
Laborer	2(25%)	18(29.03	
Professional	2(25%)	19(30.64%)	
Businessman	2(25%)	21(33.87%)	0.07
Unemployed	1(12.5%)	0(0%)	
Retired	1(12.5%)	4(6.45)	
Meat intake (adulthood)			
None	0(0%)	30(48.38%)	
1-2times/week	0(0%)	11(17.74%)	(0.0027; p<0.001)
3-4 times/week	4(50%)	7(11.29%)	
1-2times/month	4(50%)	14(22.58%)	

Childhood and adult life status factors, such as the occupation of the the worker's father/brother, were found to be significantly associated with early menopause. Similarly, larger family size with > 10 people(p-value, <0.001) and meat consumption (p- value, <0.001) were also significantly associated with early menopause, as shown in TABLE III

TABLE IV: Association between early menopause and normal menopause women socio-economic factors

S.No.	Socio-economic determinants	Chi Square Value	Degree of Freedom	P value
1	Age	15.03	7	0.035
2	No.of Miscarriages	8.41	2	0.014
3	Education	1.893	3	0.59
4	Marital Status	1.684	1	0.19
5	Occupation Status	6.139	2	0.046
6	Income	3.81	3	0.28
7	No.of Children	9.434	3	0.02

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The association between socio-economic factors of early menopause and normal menopause women was done using chi-square test as shown in TABLE III. Study shows that there is significant relationship between Age, No. of miscarriages, Occupation status, No. of children.

TABLE V: Frequency distribution of prevalence of menopausal symptoms in the study population

Menopausal Symptoms	Mild – Moderate		Severe– Very Severe	
	No.	%	No.	%
Somatic				
Hot flushes, sweating	32	45.71%	10	14.28%
Heart Discomfort	28	40%	9	12.85%
Joint & muscular discomfort	37	52.85%	12	17.14%
Sleep problems	21	30%	33	47.14%
Psychological				
Depressive mood	36	51.42%	9	12.85%
Irritability	33	47.14%	6	8.57%
Anxiety	29	41.42%	5	7.14%
Physical & mental exhaustion	37	52.85%	13	18.57%

TABLE VI illustrates prevalence of menopausal symptoms as assessed according to most frequent complaints. The most common somatic symptoms were sleep disturbance 54(77.14%), joint and muscle discomfort 49(70%), hot flushes 42(60%) and heart discomfort 37(52.85%). Among psychological symptoms, the majority were physically and mentally exhausted 50(71.42%), depressed mood 45(64.28%), irritability 39(55.71%) and anxiety 34(48.57%). However, only 9(12.85%) received medication to treat the above symptoms.

TABLE VII: Frequency distribution of knowledge towards menopause and its symptoms in the study population

Characteristics	Good knowledge		Poor knowledge	
	No.	%	No.	%
1 What is menopause?	57	81.4%	13	18.5%
2 What is the normal age for menopause?	58	82.8%	12	17.1%
3 Why does menopause occur?	23	32.8%	47	67.1%
4 When do you call that a woman is menopausal?	31	44.2%	39	55.7%
5 Can care during pre-menopausal period prevent menopausal problems?	27	38.5%	43	61.4%
6 Does lack of care during menopause predisposes to many diseases?	49	70%	21	30%
7 Menstruation stops suddenly	44	62.8%	26	37.1%
8 Genetic background influences the timing of the onset of menopause	37	52.8%	33	47.1%
9 Menopausal women gain weight and become obese	45	64.2%	25	35.7%
10 Menopausal symptoms can be prevented and treated	46	65.7%	24	34.2%
11 Menopause causes dryness and skin shrivel in women	34	48.5%	36	51.4%
12 Menopause causes urinary frequency and dysuria	29	41.4%	41	58.5%
13) Menopause affects women's concentration and memory	33	47.1%	37	52.8%
14) Increased stress level and feeling of depression in menopausal women	50	71.4%	20	28.5%
15) During menopause, the ovaries produces more hormones, progesterone & estrogen	19	27.1%	51	72.85%

According to the knowledge classification, the majority of respondent(greater than 50%) had sufficient knowledge about menopause. The majority of women, 57(81.4%) were aware of the importance of menopause and how it happened . However, most 51(72.8%) of them were unaware that the onset of symptoms was due to hormonal changes associated with menopause. The majority 82.8% knew the age range in which menopause would occur. Majority of them 50(71.4%) had good knowledge about the level of stress and depressed feelings in menopausal women (TABLE VIII)

TABLE IX: Frequency distribution of attitude towards menopause and its symptoms in the study population

Attitude	Disagree		Neutral		Agree	
	No.	%	No.	%	No.	%
(1) What does menopause mean to you?	7	10%	11	15.7%	52	74.2%
(2) Do you think menopause is good?	10	14.2%	14	20%	46	65.7%
(3) Do you feel non discloser regarding menopause is good for the women?	39	55.7%	18	25.7%	13	18.5%
(4) Do you think menopause related health education should be given in advance?	3	4.2%	7	10	60	85.7%
(5) Do you think women need to be prepared for menopause?	0	0%	13	18.5%	57	81.4%
(6) Do you ever feel that you are the only one facing difficulties during menopause?	7	10%	19	27.1%	44	62.8%
(7)Women should consult a doctor during menopause	10	14.2%	21	30%	39	55.7%
(8) Menopause is the best thing that has ever happened to women	11	15.7%	26	37.1%	33	47.1%
(9) Women are generally feeling better after menopause	12	17.1%	28	40%	30	42.8%
(10)Natural remedies for menopause are best than hormone replacement therapy	5	7.14%	24	34.2%	41	58.5%

TABLE X shows the frequency distribution of women's attitude towards menopause and its symptoms. The majority of of 52(74.2%) women agreed on the meaning of menopause. 39(55.7%) agreed to see a doctor during the menopause. A few 26(37.1%) women considered menopause to be the best they have ever had. The majority of women(42.8%) felt better after menopause. The majority 41(58.5%) agreed that a natural approach to treating menopausal symptoms was superior to hormone replacement therapy.

TABLE XI: Association between socio demographic characteristics and knowledge regarding Menopause and menopausal symptoms

Characteristics	Poor knowledge		Good knowledge		p value
	No.	%	No.	%	
Age					
<50	10	14.28%	35	50%	0.828
>50	5	7.14%	20	28.57%	

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Marital status					
Married	10	14.28%	40	57.14%	0.045
Unmarried	7	10%	8	11.42%	
Others	0	0%	5	7.14%	
Education level					
Primary/Secondary/Higher Secondary	8	11.42%	14	20%	0.039
Graduation/Post Graduation/ Phd	7	10%	41	58.57	
Menopausal status					
Pre menopause	6	8.57%	13	18.57%	0.57
Menopausal transition	9	12.85%	16	22.85%	
Post menopause	12	17.14%	14	20%	

TABLE XII shows the relationship between socio-demographic characteristics and knowledge of menopause and menopausal symptoms. As a result, it was found that married people have more knowledge about menopause than unmarried/widowed/seperated women. This difference was statistically significant($p<0.05$). The higher the educational level, the more knowledgeable about menopause and menopausal symptoms, which was statistically significant($p<0.05$). There was no association between age, menopause, menopause and knowledge of menopause symptoms. Here were no association between age, menopausal status with the knowledge regarding menopause and menopausal symptoms.

V. DISCUSSION

This study described the average age at menopause in a sample of 70 women aged 40-55 years from Hamirpur, Himachal Pradesh.The current study determined the average age of menopause at 48.5 years. The most common physical symptoms were sleep problems 54(77.14%), joint and muscle problems 49(70%), hot flushes 42(60%), and heart problems 37(52.85%).

Among the psychological symptoms, the majority were physical and mental fatigue 50(71.42%), depressed mood 45(64.28%), hypersensitivity 39(55.71%) and anxiety 34(48.57%). Another important result of this study was that most of the 41 participants(58.5%) were aware of hormone replacement therapy for menopausal symptoms. Similarly, large families of more than 10 people (p-value<0.001) and meat consumption (p-value<0.001) were also found to be significantly associated with early menopause. In adulthood, rural residence were associated with early menopause.

The study reported that more than half (87.1%) of women were not taking symptomatic medications. This study found a significant association between age, number of miscarriages and work status. This study reported that the majority of respodents (>50%) had a good understanding of menopause. The average knowledge score was 62.282. The majority of women 57(81.4%) were aware of the importance of menopause and how it happened.

However, most 51(72.8%) of them were unaware that the onset of symptoms was due to hormonal changes associated with menopause. The majority(82.8%) knew the age range in which menopause would occur. The majority of 52(74.2%) women agreed on the importance of menopause. 39(55.7%) agreed to see a doctor during the menopause. A few 26(37.1%) women considered menopause to be the best they have ever had. The majority of women(42.8%) felt better after menopause. The general knowledge of menopause in our study revealed that more than half(74.1%) of the respondents had good knowledge. This may be due to the fact that most women were above average educated.

The study found that married people are more knowledgeable about menopause than others. The higher the education level, the more knowledgeable about menopause and menopausal symptoms, which was statistically significant($p<0.05$).

The main sources of knowledge relate dto menoapuse were 33.86% internet, 22.8% medical staff, 29.7% books and so on. Various sources are there to get information about anything it may be from friends, relatives, family etc. In general, women in developing countries tends to view menopause and its symptoms as a natural process that does not require treatment and are less aware of the health problems associated with menopause.

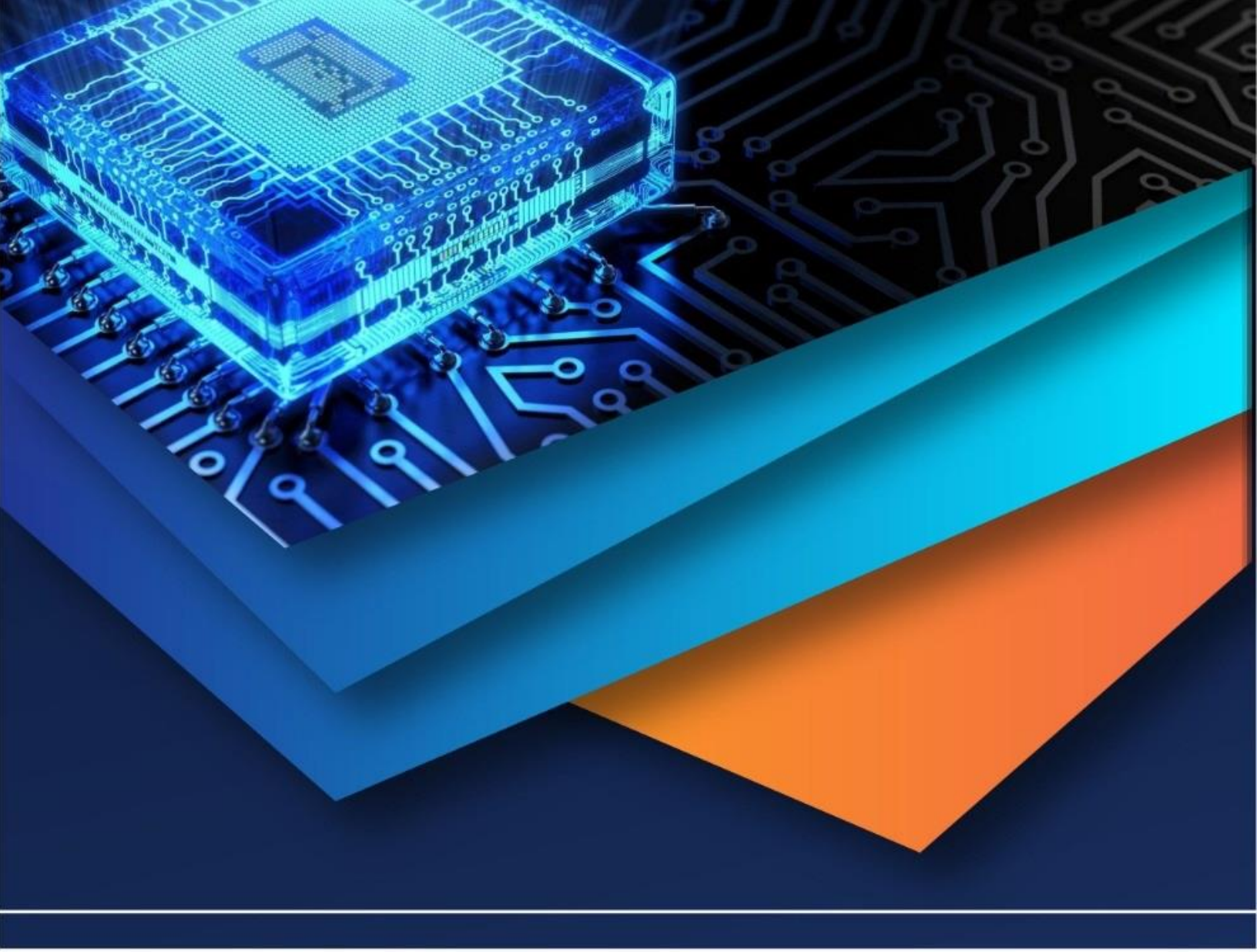
However, recent studies show that educated women in developing countries are now seeking treatment. In this study, there was a positive and significant association between socio-economic factors and health problems in menopausal women.

VI. CONCLUSION

Recent studies conclude that improving knowledge about menopause and its effects can change the attitude of middle aged women. Educating, raising and provide appropriate interventions to improve the quality of life for menstruating women. The results of this study show that the most women complain of joint and muscle pain, followed by obesity and other factors. Economic factors associated with poor health. More disciplinary action for menopausal symptoms and more pressure to promote and prevent interventions are needed.

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